Measuring Speed: Student Activity Sheet

Name:____________________________________ Date:______________________

Part 1: Measuring Speed - Distance/Time

How we measure the distance and the time doesn't really matter. It could be inches a second or miles per hour. In our case we will use "meters per second" because we are measuring distance as a meter and time in seconds. No matter what though, **speed is always distance per time.**

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

How can we say how fast the marble went?
It would be easy if the marble took exactly one second to go a meter. Then we could say "one meter per second"

$$\text{Speed} = \frac{\text{1 meter}}{\text{1 seconds}} = \text{1 meter per second}$$

What if it takes two seconds? Then we can say its speed was ½ meter per second or 0.5 meter per second.

$$\text{Speed} = \frac{\text{1 meter}}{\text{2 seconds}} = \text{½ meter per second} = \text{0.5 meter per second}$$

What if it takes three seconds? We can say the speed is _____ meter per second = _____ meter per second

$$\text{Speed} = \frac{\text{1 meter}}{\text{3 seconds}} = ?$$

To find the speed of your marble we must look at your data from **Part 1: Ramp A.** Divide 1 meter *(the distance the marble traveled)* by the **average** number of seconds it took, even if it's tenths of seconds.

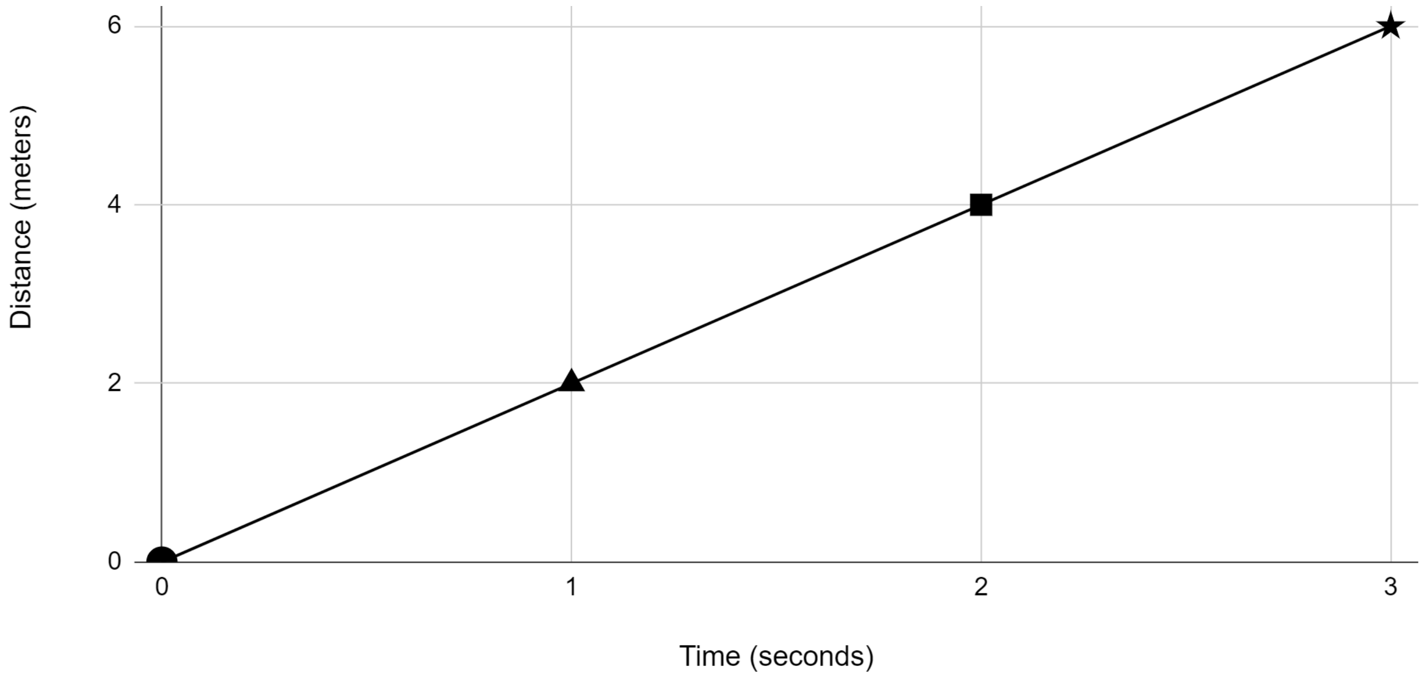
$$\text{Speed} = \frac{\text{1 Meter}}{\_\_\_\_\_\ \text{Seconds}} = \_\_\_\_\_\_\ \text{meter per second}$$

You might get answers with decimals in them, but that's OK! Your speed can be less or more than a meter per second and it doesn't have to be a whole number of meters per second.

What is the speed of your marble? ____________________ meter per second

Part 2: Measuring Speed - Distance/Time Graph

Oftentimes people create graphs to show a “picture” of their data. They even create graphs to show the distance an object travels over a period of time. Below is a graph of how far a marble traveled over 3 seconds.



Locate the **triangle (▲)**. Follow the line down. It goes to 1. Notice the title says **Time**. This means we are looking at the marble’s time of 1 second. Now follow the line to the left of the triangle. It goes to 2. Notice the title says **Distance**. This means the marble’s distance is 2 meters. So the triangle represents the marble traveling 2 meters in 1 second.

Locate the **square (■)**. Follow the line down. It goes to 2. This means we are looking at the marble’s time of 2 seconds. Now follow the line to the left of the square. It goes to 4. This means the marble’s distance is 4 meters. So the square represents the marble traveling 4 meters in 2 seconds.

How many seconds has the marble been traveling at **the star (★)**? ____________________ seconds

How far did the marble travel at the star? ____________________ meters

As the time continues to increase, what happens to the distance the marble has traveled? ____________________

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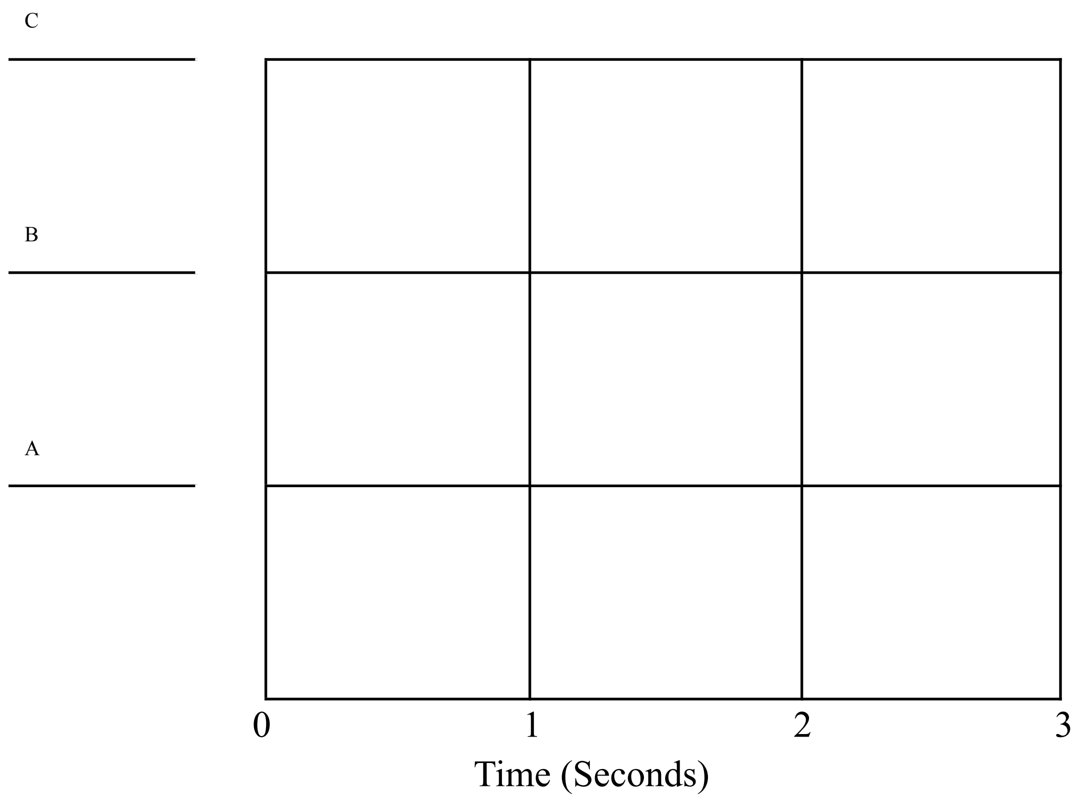
Locate the **half circle (□)**. This represents the beginning of the trial when the marble traveled 0 meters in 0 seconds.

Part 3: Measuring Speed - Graph your data

Now you will graph your data from **Part 1: Ramp A**. How far did your marble travel in 1 second **(think about what you know about speed)**?______________________meters. You will place that number on the first horizontal line **(labeled A)** next to distance. Place a dot where that line intersects the 1-second line.

We will use MULTIPLICATION to calculate how far the marble would travel at two and three seconds. Take the distance your marble traveled in one second and multiply it by two. You will place this number on the second horizontal line **(labeled B)** next to distance. Place a dot where that line intersects the 2 seconds line. Take the distance your marble traveled in one second and multiply it by three. You will place this number on the top horizontal line **(labeled C)** next to distance. Place a dot where that line intersects the 3 seconds line. Because your marble always starts at 0 meters and 0 seconds include a dot at the 0 mark. Connect all of your dots.



Compare your graph with the graph in Part 2. What do you notice about the graphs? ______________________

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If your marble kept traveling at the same speed, how far would the marble travel after 4 seconds? ___________